

First, by way of introduction, let me say that I am an Electrical Engineer, BSEE, a Senior Member of the Institute of Electrical and Electronic Engineers (IEEE), and a certified electromagnetic interference and radio interference (EMI/RFI) engineer. I have been a consultant for the last 13 years with nearly 100 customers in industries such as life-saving medical products, aerospace and defense, consumer electronics, computer, telecommunications, and instrumentation. Finally, I have been a licensed amateur radio operator for 34 years with an Amateur Extra Class license for 30 of those years.

Of course, I have been keenly involved in the Internet both as a user and as an engineer designing Internet communications and instrumentation infrastructure. As an EMI engineer, I know only too well the sometimes-extreme difficulty experienced by incompatible communications systems.

There is a basic law of physics (well, actually, information theory, to be exact) that applies here. Simply put, you can only put so much information in a communications channel before the channel is useless. A simple example of this is the telephone conference call. With one person talking, it is easy to understand. If two people are talking at the same time, it is a little more difficult to separate the voices (unless one is shouting; at which time you can't hear the other person). With six people talking on a conference call at the same time, it is useless...you can't hear anyone. This is called "Interference."

This basic concept applies to every type of communications medium: radio, cable, fiber, telephones, local area networks, television...everything! If you try to add too much information into the channel, communications is impossible. This also applies to the Broadband over Power Line (BPL) proposal currently being considered.

There are two potential problems here. The first is that the signals emitted from BPL systems will interfere with other communications users. The second is that these other communications users will interfere with the BPL users (this duality of interference almost always exists).

Let's talk about the first problem. The BPL system occupies a broad range of radio spectrum, stretching from the broadcast band through all the shortwave bands (including dedicated international shortwave broadcasting, government, military, and amateur services). While the BPL signals are meant to be confined to power lines, the laws of physics again apply; they will radiate a portion of the signal. While it may be a very small signal that is radiated, international tests (and those pesky laws of physics) tell us that the radiated levels are high enough to cause interference to sensitive radio receivers. You can expect many complaints from amateur radio operators, government and military users, and perhaps even law enforcement users in the 30-50 MHz band.

The difficulty is that these frequencies are already very crowded with many allowed users currently occupying the channel. Adding

broadband BPL communications to the mix could make reliable communications untenable in some instances and would compromise many government services that use the spectrum including the public service, law enforcement and emergency response.

Case in point: during the recent space shuttle disaster, local, state and federal law enforcement, NASA, FBI and other government services congregated in East Texas. The level of radio activity by these officers was so intense that, in some cases, law enforcement radios were completely overwhelmed and the channels were shut down. Amateur radio provided, in many cases, the only reliable communications alternative. This is because they added spectrum (and experienced operators) to the communications infrastructure needed for the emergency.

But, the presence of a BPL network in the area of Nacogdoches could have made even the amateur communications service unusable.

Let's look at the second problem, where current spectrum users would interfere with BPL users. I can state with 100% confidence that there will be many situations where BPL communications would be impossible as a result of interference. For example, a BPL system would be useless within a mile or so of any AM broadcast radio station (there are thousands throughout the USA alone), or a shortwave amateur radio stations (over 700,000 authorized amateur radio operators in the USA alone, with perhaps as many as 300,000 active in this spectrum).

Other communications services, such as law enforcement, National Weather Service, military, and even some medical equipment would cause untenable interference to these wideband users. The reason is simple: they are shouting. The signal levels of these allowed users could be so strong (even though it is restricted to a very narrow spectrum) that it will overwhelm the BPL modem. Laws of physics apply again. It is just not possible, without spending thousands of dollars for a very high performance, military grade BPL receiver, to avoid this interference.

The bottom line is this: BPL will work well in a lab or demo environment, as you have seen. But in the real world, it is a very poor choice. It will cause large-scale interference to existing, allowed users and it will be subject to debilitating interference itself.

As a broadband user of the Internet, I applaud your interest in expanding broadband alternatives. There are great alternatives here and now. Fiber-to-the-home is an exceptionally good alternative. It is here now, and offers bandwidths (or channel capacity) 100 times greater than BPL with NO radio interference! Back to those laws of physics; radios do not interfere with a light beam.

Cable, being a closed system, has proven to be highly robust and interference free. Cable interference complaints have been virtually non-existent compared to the quantity of users. Again, cable offers great user bandwidth than BPL.

To sum it up, BPL is an unreliable, interference-prone communications with limited bandwidth. Don't be fooled by a lab-perfect demo. The real world is much different. Installation of BPL systems would indeed be historic;but only in the enormous quantity of complaints it generates to the FCC. We strongly recommend that you follow the lead of other nations who have evaluated BPL technology and reject it!

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